

Claims

[c1] WHAT IS CLAIMED IS:

1. A method of determining electron tunneling values at various locations in a capacitor structure having at least a first and a second conductive plate with a dielectric material disposed there between, and wherein each said plate has first and second opposite ends, comprising the steps of;

determining the nominal tunneling voltage of said dielectric material at the thickness of the dielectric material to provide a target voltage;

applying a first voltage level equally across said first plate of from said first to said second ends;

applying incrementally changing voltage levels to said second end of said second plate, which varying voltage levels change the voltage at said second end of said second plate of each set to vary the length of the capacitive structure above said target voltage.

[c2] 2. The invention as defined in claim 1 wherein the second plate of is comprised of a plurality of segments.

[c3] 3. The invention as defined in claim 2 wherein said first plate is a unitary structure.

- [c4] 4. The invention as defined in claim 3 wherein the voltages are incrementally changed to correspond to the segments of said second plate.
- [c5] 5. The invention as defined in claim 3 wherein the second voltage is initially less than the target voltage, and is incrementally increased.
- [c6] 6. The invention as defined in claim 3 wherein the second voltage is equal to or greater than the target voltage, and is incrementally decreased.
- [c7] 7. The invention as defined in claim 1 wherein the first plate is silicon.
- [c8] 8. The invention as defined in claim 1 wherein the second plate is polysilicon.
- [c9] 9. The invention as defined in claim 1 wherein the insulating material is less than about 4 nanometers thick.
- [c10] 10. The invention as defined in claim 2 wherein the first plate is comprised of a plurality of discrete segments corresponding to the segments of the second plate, and tunneling voltage is measured at each segment of the first plate individually.
- [c11] 11. The invention as defined in claim 10 wherein a dif-

ferential amplifier is used to compare the tunneling current is compared between two segments being tested.

[c12] 12. The invention as defined in claim 2 wherein the segments of the second plate are electrically interconnected.